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SOME UNUSUAL CASES OF ORBITAL TUMORS

EMPHASIZING THE NECESSITY OF CAREFUL DIFFERENTIAL DIAGNOSIS.*

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Case I. *Abscess of the Ethmoid Cells.*—On August 23, 1886, a woman, aged twenty-seven years, was sent to me in the country, where I was staying, for my advice for some trouble with the left eye which had existed for some months, and which had occasioned her considerable anxiety because of her family history. She was a single woman in apparently perfect health, and on casual inspection there seemed to be nothing the matter with her eyes. She had first noticed a slight fullness of the inner end of the left upper lid, unaccompanied by any subjective symptom. This slight swelling had increased very gradually but without either pain or redness. Within the previous week she had become conscious of a dull ache in the orbit. A careful examination revealed the presence of a small, hard, resisting lump at the upper and inner angle of the orbit, just above the lacrymal bone, which pushed the lid before it. It seemed to be firmly attached to the periosteum of the orbit by a rather broad base, but I

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could trace no further prolongation of the growth into the orbit. The lid was freely movable over it, and the tumor was painless and nonsensitive. There was no exophthalmia and no limitation of the motility of the eyeball in any direction. The growth was the size of a small cherry, and, while hard and resisting to the finger, it was not as hard as bone. There was no interference in the functions of the eye. The patient was slightly hypermetropic, with normal vision and normal visual field, and the ophthalmoscopic examination was absolutely negative. The family history was peculiar and apparently significant. The paternal grandfather had suffered from extensive lupoid disease of the nose and cheek in his old age. The patient's father had had an epithelioma of the right external canthus, involving both lids, which had been removed by excision on two different occasions, and had returned in the cicatrix and now involved both the orbital tissue and the eyeball. One of her father's sisters had died from cancer of the breast after two operations, and another was suffering from cancer of the uterus. There was no syphilis in the family. The patient had been troubled with naso-pharyngeal catarrh for several years, but the secretion was slight except when she caught cold. A careful rhinoscopic examination showed a moderately thickened and succulent mucous membrane in the anterior nares and about the inferior turbinated bones, but there was no pus and no evidence of any disease higher up in the nasal cavity. From the clinical symptoms and the family history, a diagnosis was made of probable orbital sarcoma, starting from the periosteum of the orbit, and the patient was advised to submit to an immediate operation, as the small size of the tumor promised an easy and thorough removal. This she declined to have done, and I saw nothing of her for a period of three months. The condition was then found materially changed. The eye protruded perceptibly from the orbit and was pushed downward and outward as well as forward. The tumor was very prominent, had increased considerably in size, and extended well back into the orbit along the internal wall. There was a constant dull pain in the orbit and fron-

tal region, and the patient complained of a stoppage of the left nostril. The tumor, though still firm and resisting, did not seem as hard as it had been three months before. The middle and upper nasal meatus on the left side seemed occluded, but no positive neoplasm was demonstrable. The patient had become very nervous and anæmic, but apparently from anxiety alone, as she confessed that the pain was not severe but merely annoying. The patient had crossed diplopia from displacement of the eyeball, but the vision of each eye was normal and the ophthalmoscopic examination was again negative. She now consented to an operation, which she was told would necessarily be more serious and extensive than at first suggested, and that it might prove necessary to remove the eyeball before the tumor could be reached, but that the eye would be preserved if possible. She entered the hospital, and two days later the operation was performed, and the result proved an entire mistake in the diagnosis. A curved incision was made entirely through the upper lid and the tarso-orbital fascia, just below the superior orbital margin, from the middle of the lid inward to the median line of the nose, and the cavity of the orbit freely opened. Through this opening the tumor was easily reached and was found to extend far back along the inner wall of the orbit. In endeavoring to separate it from its attachments with spatula and strabismus hooks, its capsule was ruptured, a large quantity of foul pus was immediately evacuated, and the tumor collapsed. A careful examination showed that it had been an abscess of the ethmoid cells. The inner wall of the orbit had disappeared by suppuration and absorption and the body of the ethmoid was one large cavity. The lacrymal bone was immediately punctured, a free opening through it made, and then communication was made with the superior and middle nasal meatus by breaking down some thin bony obstructions. Pus soon appeared in the inferior meatus, and free irrigation was then at once made through the ethmoid cells by syringing with a warm bichloride solution. This was continued until the fluid dropped clear from the nostrils. The wound in the orbit was then carefully washed out, a drainage-tube

introduced well into the ethmoid cavity, and cold dressings applied. As soon as the patient had regained consciousness she was placed in a sitting posture in bed, and kept in this position for three days. The ethmoid cavity and nostrils were irrigated twice a day with the antiseptic solution, and on the fourth day the drainage-tube was removed. There was little or no reaction, the purulent discharge rapidly subsided, the wound granulated from the bottom, and in two weeks the patient was discharged. At the end of a month the diplopia had disappeared, and there was only a trace of exophthalmia left.

In this case the mistake in diagnosis was due to the appearance and feeling of the tumor, to the absence of all signs in the nose at first, and to placing too much importance on the family history of cancer.

Case II. *Adeno-sarcoma of the Lacrymal Gland.*—In May, 1889, a gentleman, aged thirty-five years, was sent to me complaining of an annoying excrescence of one of his lids, as he called it. An examination showed a protrusion of the outer angle of the left upper lid of considerable extent, and a slight displacement of the eyeball downward and inward. On everting the lid a dark-red, lobular mass presented itself, which occupied the upper and outer angle of the orbit, and seemed to be firmly attached to the periosteum. It was closely applied to the eyeball and appeared to extend some distance back into the orbit. The tumor was hard and non-sensitive, and occupied the site of the lacrymal gland. It had been growing for more than a year, but had occasioned no pain and had only recently become annoying. It was freely movable over the eye, but was firmly attached to the bone. No family history of any significance was elicited. A diagnosis was made of tumor of the lacrymal gland, probably malignant, and the patient was advised to have it removed immediately, before any further extension to the orbital tissue, and to this he consented. The operation was done at his residence as follows: Under ether anæsthesia the external can-

thus was freely incised for about an inch beyond the canthus and the superior canthal ligament divided. The upper lid was then everted and held in place by a tenaculum in the hands of an assistant. The tumor was then seized by a double tenaculum and put upon the stretch, and was then rapidly separated from its loose attachment to the eyeball, care being taken to avoid opening the sheath of the external rectus muscle. The tumor extended some distance backward into the orbit and its under surface was flattened. The adhesions to the periosteum were very firm, but with care and patience the gland was removed intact. The upper *cul-de-sac* was then incised and the accessory gland in the upper lid was dissected out. The cavity was then irrigated and a careful examination was made of the orbit to discover the presence of any diffuse or circumscribed infiltration. Nothing was found, and after a second careful irrigation the incision in the conjunctival *cul-de-sac* was closed by three fine sutures, and the eye closed under cold antiseptic dressings. There was no suppuration, the case healed rapidly, and the patient was discharged on the eighth day. There has been no recurrence of the growth.

The tumor measured an inch and a half in its longest diameter, somewhat over an inch in breadth, and was lobulated and of irregular thickness. It was inclosed in a tough capsule. After hardening it was split open in its long axis, and showed the glandular structure somewhat compressed by hypertrophied trabeculæ. A microscopical examination showed marked hypertrophy, both of the glandular elements and the connective-tissue framework. Scattered all through the tumor, within the acini and between the fibres of the connective-tissue trabeculæ, were very numerous round cells and a few fusiform cells. The vascularity of the gland was much increased, particularly in the fibrous envelope of the gland. A careful comparison of the various microscopic sections cut from different parts of the tumor showed it to be a good example of adeno-sarcoma, with marked tendency to hypertrophy of the connective-tissue elements of the gland.

Case III. *Fibro-sarcoma of the Lacrymal Gland.*—In De-

cember, 1887, a young lad, aged fourteen years, was brought to me by his mother, with the statement that for the past five months she had noticed a tumor of the upper lid of the left eye of the boy, which had grown so as to excite her alarm. The patient was a pale, badly nourished, undersized lad, who had never been strong, and had often suffered from glandular enlargements. An examination showed a tumor at the upper and outer angle of the left orbit, which not only pushed the lid downward and forward, but had produced partial eversion of the lid, and presented somewhat below the everted margin of the lid. There was a very slight displacement of the eyeball inward, and when he looked toward the left there was homonymous diplopia. On pulling the lid outward and everting it completely the tumor appeared as a hard, resistant, somewhat lobulated mass of a bright-red color, freely movable under the lid and over the eye, but firmly attached to the bone of the orbit. It extended some little distance into the orbit and was slightly sensitive to the touch. The vision of this eye was normal. In the right eye, on the temporal side, and encroaching on the margin of the cornea, was a small dermoid tumor as large as a large pea and covered by fine hairs. In view of the youth of the patient the growth in the left side was assumed to be rather benign than malignant, and as he had frequently suffered from enlarged and suppurating glands, a diagnosis was made of hypertrophy of the lacrymal gland. The mother was advised that the tumor be removed before any further increase in size should cause damage to the eye, and she consented to have this done. An incision was made through the outer half of the upper lid, just beneath the superior orbital margin and opening directly into the orbit. It was found that the eversion of the lid had been mainly caused by the sagging down of the accessory gland in the lid, which was very much enlarged. The main tumor was found thickly incapsulated and adherent by a broad base to the periosteum of the frontal bone. It was grasped with a tenaculum and was dissected out intact with very little difficulty except at its base, where the adhesions to the bone were very firm. The palpebral portion of the gland was then

removed through the same opening. There was rather profuse hæmorrhage, which lasted for some time and delayed the final steps of the operation. An examination of the orbit showed no further growth and no infiltration of the orbital tissue, and the cavity was irrigated with a warm bichloride solution and closed by deep sutures, going entirely through the tarso-orbital fascia. The case did very well, though there was considerable swelling of the parts for three days, but there was no suppuration and but very slight rise in temperature.

The tumor, exclusive of the palpebral portion, was about the shape and size of a large almond, but irregularly lobulated. It was hardened and numerous microscopic sections cut from it, which were then carefully studied. The growth, instead of being a simple hypertrophy of the gland, proved to be an unmistakable fibro-sarcoma, with marked infiltration of the glandular structure with small round cells, and numerous fusiform cells between the hypertrophied connective-tissue fibres of the trabeculæ and in the markedly thickened capsule.

This patient subsequently developed a suspicious tumor in the neck, which grew very rapidly, and he died two years later of exhaustion and anæmia.

Case IV. *Myxo-sarcoma of the Sphenoid, Ethmoid, and Orbit.*—In December, 1887, I first saw a lady, aged fifty-six years, who gave the following history: For about a year she had suffered from a dull pain in the right side of the nose, near the glabella, and in the right orbit, which at first was intermittent, but for some months had been constant and of late quite severe. There had been no interference with the functions of the right eye until three months ago, when she began to see double and the eye began to protrude. About the same time there appeared a rather profuse discharge from the right nostril, which still continues and seems to be purulent in character. The vision of the right eye had recently become somewhat impaired. On examination, the eye was found to protrude forward and outward, and was limited in motility inward and upward. There was a moderate amount

of deep subconjunctival injection and some chemosis. The iris was normal in appearance and reaction, the media were clear, and the fundus was normal. Vision in this eye was $\frac{20}{40}-$, and in the left eye was normal. When the patient looked to the left there was crossed diplopia, the image of the right eye being somewhat lower than that of the left eye. The right nostril was nearly occluded by what seemed to be thickened mucous membrane and crowding down of the inferior turbinated bone, and the same thing was observed in rhinoscopic examination. On the floor of the right orbit, near the inner wall and encroaching on the inferior orbital margin, there was a hard, flattened growth, which was smooth and non-sensitive. By the crude methods of transillumination then in use, there was no reflex from the anterior wall of the maxillary antrum. A diagnosis was made of tumor of the antrum, which had perforated the roof of the antrum and entered the orbit. The grave nature of the lesion was at once recognized, and also the probable extension of the disease to other neighboring cavities, and it was deemed impossible to attempt any operation for its removal without a preliminary enucleation of the eyeball. To this the patient consented, and it was decided to operate at once. Under profound anæsthesia the right eye was removed in the usual manner, and, after the hæmorrhage had ceased, a careful examination was made of the orbit. The tumor in the orbit was found to extend backward nearly to the apex, and was directly continuous with a mass which entirely filled the maxillary antrum. The floor of the orbit was absent for about three quarters of its antero-posterior diameter, the inferior orbital margin being practically intact. The growth was carefully removed from the orbit and then from the maxillary antrum. The latter cavity was then thoroughly washed out, and an examination of its interior revealed that the growth had extended through the orifice leading from the antrum into the middle nasal meatus. The contents of the orbit were next entirely removed down to the periosteum, and it was then seen that the tumor involved both the sphenoidal fissure and the ethmoid cells, as part of the os

planum of the ethmoid was absent, and the growth was seen to fill the ethmoid cells. The condition of the patient was found to be much more serious than had been at first supposed, and it became incumbent upon me to complete the operation as soon as possible. The remains of the os planum were at once taken out and the entire contents of the ethmoid cavity were removed. The lacrymal bone was cut away and the growth removed from the nasal meatus, and also the middle and inferior turbinated bones. A large communication was thus made from the ethmoid down to the inferior meatus of the nose, and free irrigation brought away numerous small pieces of the tumor. Another careful examination revealed the hopelessness of the case, for the growth undoubtedly involved the sphenoidal antrum, as well as the sphenoid and palate bones. A drainage-tube was introduced into the ethmoid cells and brought out through the nostril. The orbit was loosely packed with iodoform gauze and cold antiseptic dressings applied. The patient rallied well from the operation, and on the fourth day the drainage-tube was removed, as free irrigation was easily maintained. She did very well for a month, her temperature having fallen on the fourth day, and there was no further rise. At the end of a month she was discharged from constant observation. There was at this time a healthy looking orbit and maxillary antrum, and no demonstrable return of the growth in the ethmoid cavity, and there was no discharge from the nose. She still complained, however, of deep-seated headache, and two months after the operation the tumor reappeared in the orbit, coming from the sphenoidal fissure. Somewhat later the ethmoid cavity began to fill up. I declined all further operative interference, and told the patient's family of the inevitable termination of the case. She died about ten months later, apparently of exhaustion. At that time the growth had filled the orbit and protruded upon the cheek. It had extended into both nostrils and pharynx, and had refilled the right maxillary antrum. It had not extended into the left orbit, and vision in the left eye remained good up to the end.

The tumor had undoubtedly originated in the sphenoid antrum and had thence extended to the adjacent cavities and bones of the face. No autopsy was held, but there is no doubt that the disease would have been found in the frontal sinus. The tendency of most of these tumors is to extend from within outward, which is probably the explanation why an extension to the cavity of the skull is comparatively rare, and, when it does occur, why it is one of the last directions in which the disease tends to extend.

The tumor proved, on microscopical examination, to be a myxo-sarcoma, with numerous small round cells, some few large nucleated cells, with very little connective tissue, but with the cells imbedded in an almost homogeneous, finely fibrillated tissue.

Case V. *Malignant Tumor of the Anterior Cerebral Fossa and Orbit.*—Early in February, 1888, I was asked to see in consultation a woman, aged forty-three years, who gave the following history: For about eight months she had complained of constant frontal headache, mainly confined to the right side of the forehead, but occasionally extending to the left side. These headaches were very severe for some months, but of late they had become much less so, and had been succeeded by a constant dull ache in the right orbit. About three months before I saw her she began to complain of diplopia and vertigo, and the latter symptom had been considered by her family physician as due to the double vision. The right eye soon began to protrude, the displacement being downward and outward as well as forward. The vision failed rather rapidly, and the sight of the left eye also became somewhat affected. When I saw her the exophthalmia was very marked, in the direction downward, outward, and forward, and the motility inward and upward very limited. The media were clear, but the optic nerve was of a dirty-white color, with small arteries. The disc was clearly defined. Vision in the right eye was reduced to perception of light. In the left eye there was a very slight reduction in the calibre of the arteries, but the disc was nearly normal in color and appearance and vision was $\frac{20}{50}$.

A very careful examination of the right orbit did not reveal the positive presence of a tumor, though I thought that I detected a slight swelling on the root of the orbit near its junction with the inner wall.

The patient was an old syphilitic, and, in view of the severe frontal headaches which had marked the onset of the disease, it was inferred that she had a severe, extensive periostitis of the frontal bone and perhaps of other bones of the orbit, which had ended in the development of a diffuse gummatous infiltration or perhaps even of a hyperostosis. With this diagnosis in view she was put upon very large doses of potassium iodide, which was pushed rapidly to toleration, combined with moderate doses of mercuric bichloride. She bore the treatment very well, but the symptoms continued to increase, and after two months, there being no improvement, and the vision of the left eye having diminished to $\frac{20}{100}$, the treatment was discontinued. During all this time strychnine had been administered in the hope of arresting the degeneration of the optic nerves. The vertigo and staggering in gait had disappeared before I saw her, which rather confirmed the diagnosis of her physician that they were due to the diplopia, for as the vision of the right eye became abolished the double vision and vertigo ceased.

At the end of the second month the exophthalmia had increased and a tumor could be made out above and on the inner side of the orbit, and I decided to attempt its removal. The eyeball was enucleated in the usual manner, and the presence of a tumor was at once manifest, apparently attached to the roof and inner wall of the orbit. A more careful examination, however, showed a large, irregular hole, opening directly into the anterior fossa of the skull, and through this the tumor protruded into the orbit. The hole in the roof measured, roughly, about an inch in all directions. Very careful manipulation with the finger and probe showed that the growth was firmly attached to the dura mater and extended into the anterior fossa in all directions. The location of the tumor explained the severe headache, and the lessening in the severity of these headaches was probably due to the per-

foration of the roof of the orbit and the extension of the tumor into the orbital cavity, which diminished the pressure on the brain. The growth probably extended far backward in the cerebral fossa and must have pressed upon the right optic nerve and even the optic commmissure, as both nerves were affected. Unfortunately, no examination of the fields of vision had been made by any one previous to the loss of vision in the right eye. If this had been done something might have been learned from the fields and their limitations, which would have assisted in the diagnosis.

The nature of the lesion, of course, prevented any further operative interference, and the case was treated as one of simple enucleation. I was enabled to see the patient for a month after the operation, and the tumor increased slowly in size during that period. She then left the city and I have heard nothing of her since.

Case VI. *Sarcoma of the Dura Mater and Orbit.*—In January, 1889, a lady, aged thirty-two years, called on me with her husband, and gave the following history: For more than two years she had been conscious of a dull ache and discomfort in the right orbit, with occasional headache. For several months she had noticed a steady failure of vision in the right eye, and recently the same thing in the left eye. There was also some protrusion of the right eye. The headache had never been constant, but of late had increased in frequency and severity, and the pain in the orbit was also more severe. There had been no other head symptom.

An examination of the eyes showed the following existing conditions: Moderate exophthalmia on the right side, the protrusion being directly forward. No loss of motility in any direction. Iris and pupil normal. Media clear and fundus perfectly healthy. Refraction hypermetropic. The right eye could be pushed back in place without causing any pain, but when the pressure was relieved the exophthalmia returned. The left eye was normal in every respect. An examination of the field of vision of the right eye showed a marked limitation downward and outward. The urine was normal and, with the exception of the headache and the

limitation of the field, there were no symptoms suggestive of cerebral disease, and, as both these symptoms might be caused by a growth at the apex of the orbit, a provisional diagnosis was made of orbital tumor. The vision was $\frac{20}{200}$ in the right eye and $\frac{20}{30}$ in the left eye. There was no disturbance of the color sense. I advised waiting for further developments.

The symptoms increased slowly, and it was not until nearly a year had elapsed that the exophthalmia had reached such a degree as to point unmistakably to the presence of an orbital tumor. The headache had changed but little and the vision of the right eye was slightly worse, while that of the left eye remained unchanged. No growth was visible or even tangible in the orbit, and it was possible that its location was at the extreme apex of the orbit and on the nasal side. The patient was told that an attempt should be made to remove the tumor, and that it would be necessary to sacrifice the eye in the operation, and to this she consented.

Under ether anæsthesia the right eye was enucleated in the usual way, and an examination then showed that the entire apex of the orbit was filled by a growth which seemed firmly united to the periosteum. The contents of the orbit were then entirely removed down to the periosteum and carefully examined. The growth surrounded the optic nerve, and the muscles and nerves were all involved in the neoplasm. After the cavity of the orbit had been washed out the growth could be seen protruding from the optic foramen and sphenoidal fissure. The orbit was then closely packed with iodoform gauze and a bandage applied. The patient rallied promptly from the ether and effects of the operation and was up and about within a week. The pain in the orbit ceased at once and the headache became less severe for nearly two months. It then returned with its former severity, and at times the patient became delirious. She succumbed to an attack of pneumonia five months after the operation, but the growth had already reappeared at the apex of the orbit. No autopsy was allowed.

The tumor had probably originated in the dura mater on the right side, somewhere in the vicinity of the sella turcica,

and may have spread backward into the middle fossa, as well as forward through the optic foramen and sphenoidal fissure. If there had been any positive evidence of an intracranial growth, I should have declined to operate, as the case would then have been classed as among the inoperable tumors. The orbital part of the growth was sarcomatous in character. Sections showed that the orbital cellular tissue, the muscles, and the sheath of the optic nerve were all infiltrated with masses of small round cells, with groups of fusiform cells scattered between them.

Case VII. *Cystoid Angeioma of the Orbit.*—In the autumn of 1890 a gentleman, aged twenty-two years, called on me, complaining of exophthalmia and a pulsation in the orbit back of the eye, and gave the following history: When a boy of ten years of age he had received a wound of the right orbit from a sharp twig, the end of which had torn the conjunctiva near the external canthus and entered the orbit, and it was removed by a physician on the same day. There was a great amount of reaction, the lids being very much swollen, and ever since the right eye had turned in toward the nose. The vision of the eye was somewhat impaired, but subsequently improved, and he had no further trouble with it until about two years before I saw him. He had always been conscious of a stiffness in its motions, and at times he felt a pulsation in it, but at this date the feeling of pulsation became continuous, and soon after the eye began to protrude.

On examination, I found the right eye situated on a lower plane than the left eye, and the exophthalmia was forward and outward. The motility outward was somewhat impeded. The upper lid was swollen and thickened, hung down over the cornea, and pulsated. When viewed in profile the whole eye was seen to pulsate, and this motion was communicated to the fingers when placed upon it. At the upper and outer angle of the orbit could be felt a ridge of bone running backward into the orbit. The media were clear, the iris and pupil were normal, the fundus had a grayish hue, and the retinal vessels were all engorged and pulsated strongly. Vi-

sion of the right eye was $\frac{20}{30}$. The left eye was normal in every particular. The subconjunctival vessels were much engorged. On pressing the eye backward a distinct elastic mass was felt behind it. No growth could be felt in the orbit on either side, above or below.

A diagnosis was made of vascular tumor of the orbit, of unknown nature, but presumably of traumatic origin. Pressure on the carotid in the neck produced no effect on the pulsation or the exophthalmia. As there had been no cerebral symptoms at the time of the injury and the case proved to be one merely of orbital injury, the probability was that the orbital walls had not been fractured and that the injury was confined to the vessels of the orbit. The exact nature of the tumor it was impossible to determine. An incision was made in the ocular conjunctiva on the temporal side, and a small trocar was introduced and passed down toward the apex of the orbit. It met some resistance, which suddenly gave way, and this was followed by a small gush of thick, dark-brown, almost black blood. The exophthalmia receded somewhat but not entirely, and after a few seconds the flow of blood stopped. The result of the puncture and the after-conditions seemed to contraindicate the presence of any aneurysmal tumor and to favor the view that the lesion was cystoid in character. In less than a week the exophthalmia was as great as before the puncture and the pulsation was as marked, if not even more so. The location of the tumor at the apex of the orbit and its vascular character would have prevented any attempts at its removal, unless preceded by enucleation of the eye, and this I was extremely reluctant to do, on account of the very good existing vision. I therefore decided to first try what could be done by electrolysis, recalling the report of a very successful case by Dr. Thompson, of Indianapolis (*Archives of Ophthalmology*, xii, 1, 1883). Under cocaine anæsthesia the wound in the conjunctiva was reopened, and the negative pole, consisting of a long steel needle, was introduced to the bottom of the orbit through the tumor. The positive pole, a moist sponge, was then placed over the temple, and the current was passed in this way in-

directly through the tumor for six minutes. The strength of this current was about six milliampères, and caused severe pain. Some little reaction followed which was readily controlled by cold dressings. One week later, there being no reduction in the exophthalmia, a second attempt was made, and on this occasion both poles were passed into the tumor, one on each side of the eyeball. The same strength of current was employed for about the same length of time. This was followed by a decided lessening of the pulsation and some reduction of the exophthalmia. Four additional applications of the electric current were made at intervals of one week, making six in all. The result, while partially successful, was not entirely so, for while both the pulsation and the exophthalmia were materially lessened, the case was not cured. One unsatisfactory feature of these applications was an increased loss of motility, both outward and inward, of the eye.

After the last application of electrolysis the case remained for nearly two months. The pulsation then began to increase again, and the eye became more prominent. It seemed useless to resort to this method of treatment again, and as the vision of the right eye had materially failed, I decided to enucleate the eyeball and attempt the removal of the tumor *en masse*. The patient was etherized, and the eye was enucleated in the usual manner. Very firm adhesions were found between the tumor and the eyeball posteriorly, and in separating them more or less blood was lost. The optic nerve was divided close to the globe without any difficulty and the latter removed. After washing out the orbit, the apex of the cavity was seen to be filled up by a dark mass, which had no visible pulsation, but on pressing upon it with the finger a distinct pulsation could be felt. The contents of the orbit were then carefully dissected out, and as the apex of the orbit was reached, several vessels of considerable size were met and ligated, one of these being probably the ophthalmic artery. There was comparatively little blood lost, though after the tumor was removed there was considerable oozing, which was finally controlled by iced applications and

pressure. The orbit was then thoroughly washed out with bichloride solution (1 to 1,000), and was then packed tightly with iodoform gauze, and a pressure bandage was applied over the closed lids. There was almost no reaction, and on the second day the packing was removed, the orbit again washed out, and the packing and bandage reapplied for two days longer. The packing was then removed and cold dressings applied. The patient was discharged on the twelfth day, and he has had no return of any trouble since.

An examination of the tumor showed some interesting features. It was found to occupy mainly the pyramidal space or funnel between the ocular muscles, but it extended outside the muscular barrier and involved the fatty tissue at the rear of the orbit and extended forward upon the eyeball. It surrounded the optic nerve, which was compressed by the growth. The unusually dark color of the tumor gave the impression of a melano-sarcoma, which was dissipated after it had been opened by a longitudinal incision. It was surrounded by a tough, thick capsule of very dense connective tissue, which under the microscope contained quantities of brown pigment, some in fusiform cells and some as free granules. In the centre were numerous vacuoles containing a thick, dark brown, grumous fluid. These vascular spaces were separated by trabeculæ or partitions of connective tissue, which also contained pigment. Here and there on the walls of the lacunæ were small patches of epithelium which were deeply stained. The points where the needles had entered in the operation of electrolysis were distinguished by the partial destruction of the connective-tissue envelope and the obliteration of the neighboring vacuoles. The optic nerve ran through the centre of the tumor, and cross sections of the nerve showed atrophy of the nerve fibres, but no thrombus of the central retinal artery. Like all tumors of this nature, its progress had been very slow, but the only point in which it differed from similar cases was in the presence of a distinct pulsation, which was not only felt by the patient but observed by the surgeon. Portions of the tumor were so solidified that I could not but think that had the electrolysis been persisted

in a cure would have been effected and the patient would have been spared the more serious operation and the loss of the eye.

Since the foregoing was written the report of a very interesting case of cystoid angeioma of the orbit has appeared in the *Annales d'oculistique* for September, 1895, from the pen of E. Valude, in which two applications of electrolysis proved successful in causing a disappearance of all the symptoms.